10TH ANNIVERSARY ISSUE

Check List the journal of biodiversity data

NOTES ON GEOGRAPHIC DISTRIBUTION

Check List 11(1): 1534, January 2015 doi: http://dx.doi.org/10.15560/11.1.1534
ISSN 1809-127X © 2015 Check List and Authors

On the snake *Siphlophis worontzowi* (Prado, 1940): notes on its distribution, diet and morphological data

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Abstract: We provide geographic data for the poorly known dipsadid *Siphlophis worontzowi* including the first records to the Tocantins state and on the left bank of Madeira River at Rondônia State. Our data also extend its distribution on Mato Grosso State. We also provide new morphometric, meristic and ecological data to the knowledge of this species.

Key words: herpetofauna, Amazon dipsadid, ecology, natural history

The snake *Siphlophis worontzowi* (Prado 1940) is an Amazonian dipsadid widely distributed occurring from Santarém, Pará state, Brazil to Tinkanari, Cuzco, Peru (Prado 1940; Silva-Jr. 1993; Zaher and Prudente 1999; Santos-Jr. *et al.* 2003; Vriesendorp *et al.* 2004; Frota *et al.* 2005; Bernarde and Abe 2006, Moravec *et al.*, 2009; Costa *et al.* 2010; Kawashita-Ribeiro *et al.* 2011; Bernarde *et al.* 2012; Matos and Melo-Sampaio 2013). Although these records cover a wide area of the Amazon basin they account only for a few localities; all of them on the south (right bank) of Amazon and Madeira Rivers. Both rivers are known to be important vicariant barriers for many faunal groups separating sister lineages (Ayres and Cluttonbrock 1992; Haffer 1992, 2008; Hayes and Sewlal 2004; Fernandes *et al.* 2012; Ribas *et al.* 2012; Teixeira Jr *et al.* 2013).

The genus *Siphlophis* is considered a forest dweller with semi-arboreal and nocturnal habits, feeding mainly upon lizards (Martins and Oliveira 1998; Marques *et al.* 2001; Mollo Neto *et al.* 2013). Despite the information provided for some species of the genus, little is still known on the biology of the species *Siphlophis worontzowi*. The few specimens mentioned in the literature were found in pastureland, primary or disturbed forests, usually climbing or resting on the vegetation generally at night (Bernarde and Abe 2006; Moravec *et al.* 2009; Costa *et al.* 2010). Its dietary preferences are also poorly known and Prudente *et al.* (1998), Bernarde and Abe (2006) and Gaiarsa *et al.* (2013) describe only four items: three lizard species (*Iphisa elegans*, *Gonatodes humeralis* and *Hemidactylus mabouia*) and a frog without identification.

Herein, we add new distributional data on this poorly known species providing the first record on the left bank of Madeira River at Rondônia state and the first record at the Tocantins state. Our data also extend its distribution southeastward over the state of Mato Grosso, Brazil. Additionally we present new morphometric and meristic data as well as habitat and diet information.

We analyzed eleven specimens of *Siphlophis worontzowi* deposited at the Herpetological Collection of Museu de Zoologia da Universidade de São Paulo (MZUSP), São Paulo, Brazil. Five of them were found during a three-year (2010–2012) sampling project taken at forests of Rondônia state. This area comprises both banks of Madeira River (for detailed effort spent and habitat description see Teixeira *et al.* 2013), an area dominated by *várzea* forest, with dense leaf litter and relatively open canopy.

Specimens examined add five new localities to the currently known distribution of the species (Figure 1). Two individuals (MZUSP 19290 and MZUSP 19289) (Figure 2A, B) were collected on April 2011 at Babaçulândia municipality (06°59′43.01″ S, 047°32′47.21″ W, 160 m above sea level [a.s.l.]) in the gallery forest of Tocantins River, Tocantins state, representing the first record of *S. worontzowi* for the state. These two specimens also represents the easternmost record for the species, extending its distribution range *ca.* 900 km from the closest record at Santarém, Pará (Santos-Jr. *et al.* 2003). This last record creates a large gap in its distribution along central-eastern Pará, probably due to incipient sampling effort (Cunha *et al.* 1985; Nascimento *et al.* 1991; Prudente and Santos-Costa 2005; da Silva *et al.* 2011; Bernardo *et al.* 2012) allied to its local rareness.

Three new records from Mato Grosso state also extend the distribution of *S. worontzowi*. The specimen MZUSP 11345 from São José do Rio Claro municipality (*ca.* 13°25′ S, 056°42′ W), extends *ca.* 350 km southwards and 450 km southeastwards the species distribution from the closest records at Alta Floresta municipality, Mato Grosso state and Espigão D'Oeste municipality, Rondônia state, respectively (Zaher and Prudente 1999; Bernarde and Abe 2006; Costa *et al.* 2010). MZUSP 11251 was collected at Cláudia municipality, located in the east-central part of Mato Grosso state (*ca.* 11°29′ S, 054°53′ W) and *ca.* 200 km southeastwards from the closest record at Alta Floresta municipality (Costa *et al.et al.* 2010). MZUSP 11323, was collected at night on 14 June 1997, climbing the vegetation *ca.* 50 cm above the ground at Juruena

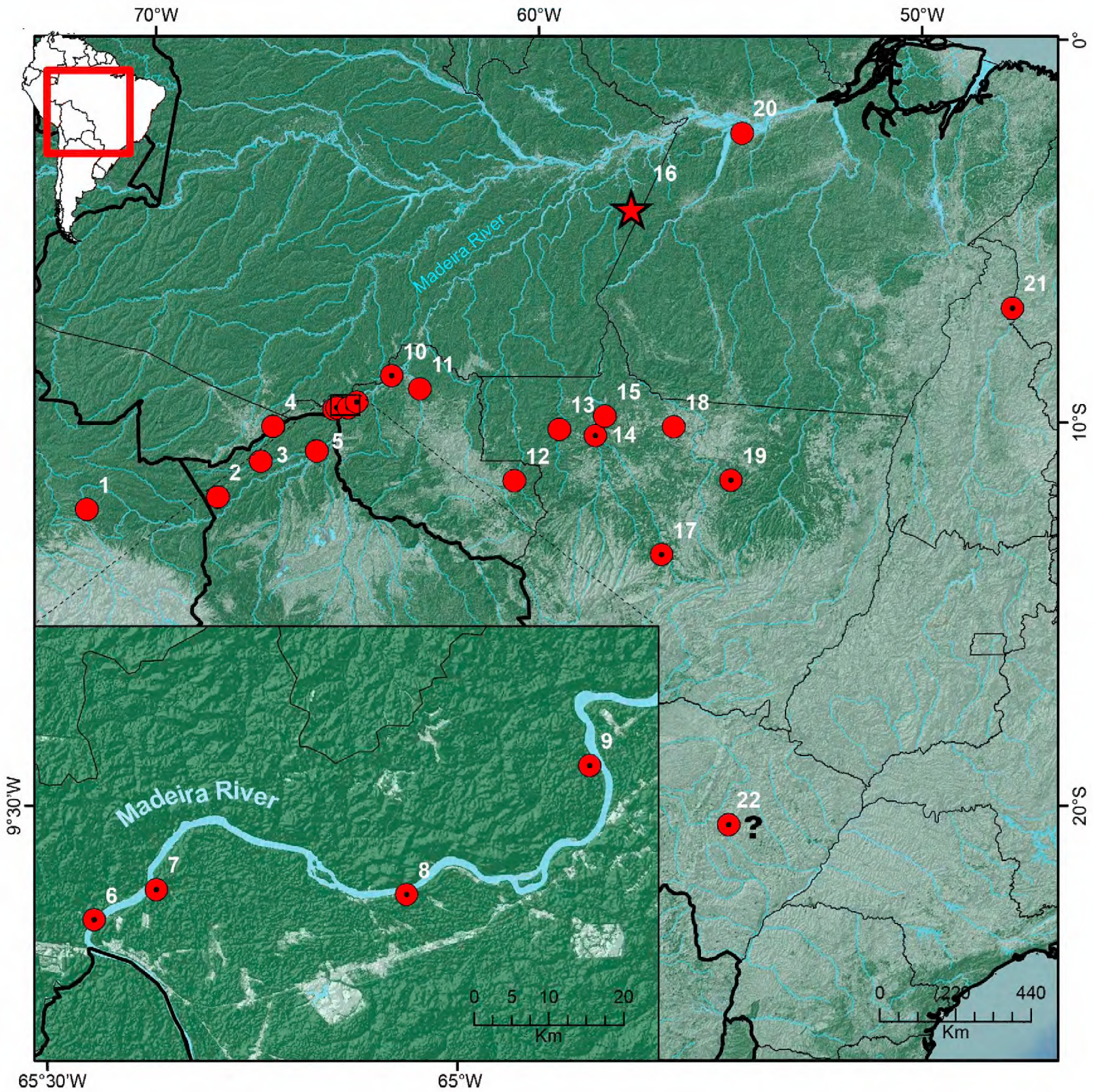

Figure 1. Distribution map of *Siphlophis worotzowi* throughout the Amazon basin. Inset map shows the new records at both banks of Madeira River, municipality of Porto Velho, Rondônia, Brazil. Red marks indicate records of *S. worotzowi*; Marks with a black dot indicates new records; Star indicates the type locality; question mark indicates an unverified new record. **Peru**: 1,Cusco. **Bolivia**: 2, Manuripi; 3, Abuna; 5, Federico Román. **Brazil**: 4, Acre: Senador Guiomard; Rondonia: 6 and 7, vicinities of Abunã; 8, vicinities of Mutum-Paraná; 9, vicinities of Caiçara falls; 10, Porto Velho; 11, UHE Samuel; 12, Espigão d'oeste; Mato Grosso: 13, Aripuanã; 14, Juruena; 15, Cotriguaçu; 17, São José do Rio Claro; 18, Alta Floresta; 19, Cláudia; Amazonas: 16, Rio Amanã (type locality); Pará: 20, Santarém; Tocantins: 21, UHE Estreito, Babaçulandia; Mato Grosso do Sul: 22, Campo Grande (unverified specimen).

municipality (10°19′25″ S, 058°29′84″ W, 272 m a.s.l.), 100 km from Aripuanã and 230 km from Alta Floresta, the closest records (Costa *et al.* 2010). The sixth specimen analyzed, MZUSP 19797, is from Porto Velho municipality, Rondônia state (Approximately coordinate: 08°45′ S, 063°54′ W) about 100 km from Samuel Power Plant (Silva-Jr. 1993).

An unpublished record of *Siphlophis worontzowi* from Campo Grande municipality, Mato Grosso do Sul state, was based on an individual housed at the Herpetological collection of the Instituto Butantan (IB 29074), São Paulo, Brazil (M. Gaiarsa, pers. comm.). Unfortunately, this individual is probably lost now. It was recorded in the collection catalogue previously to a fire accident on May 2010, which destroyed most of the specimens housed there. As we could not properly verify its identity, we only indicate its putative presence in Mato Gosso do Sul. If confirmed, this record would be the first of *S. worontzowi* in this state extending its distribution southwards in about 800 km from the closest record at São José do Rio Claro, Mato Grosso, Brazil (this study).

Among the five specimens collected at Porto Velho, three were found at the right bank of Madeira River. MZUSP 19464 and MZUSP 20782 were found near the old district of Mutum Paraná (09°36′14.85″ S, 065°03′31.35″ W, 106 m a.s.l.), on 20 April 2011 and 14 October 2012, respectively, at night. The former was found around 22:00 climbing a palm leaf 2 m above the ground; the later was moving in the leaf litter around 20:00. MZUSP 20781 (Figure 3A) was found at night on 9 October 2012 (around 23:00) near the district of Abunã (09°35′52.87″ S, 065°21′48.64″ W, 115 m a.s.l.), 5 m above the ground, active on the vegetation. This specimen had fed upon a *Copeoglossum nigropunctatum* (Spix, 1825) (MZUSP 103868), a lizard commonly found at that area (pers. observ.), representing a new diet record for this species. The skink was partially digested but most of the body was preserved

Figure 2. *Siphlophis worotzowi*. **A:** MZUSP 19290. **B:** MZUSP 19289, both from Babaçulândia municipality, Tocantins state, Brazil.

Figure 3. *Siphlophis worotzowi*. **A:** MZUSP 20781 found at the right bank of Madeira River. This specimen had preyed upon a *Copeoglossum nigropunctatum,* note the expansion on the middle body; **B:** MZUSP 19751 found in the left bank of the Madeira River, both at municipality of Porto Velho, Rondônia state, Brazil.

Table 1. Morphometric and meristic data from all eleven individual analyzed and others from literature; [1]Prado, 1940; [2]Costa *et al.* 2010; [3]Moravec *et al.* 2009; [4]Silva-Jr., 1993. "?": lack of information; F: Female; IL: infralabials; M: Male; PrO: Pre-ocular scale; PsO: Pos-ocular scales; SL: supralabials; SVL: Snout-vent length; TL: Tail length.

Voucher	Sex	Dorsals	Apical Pits	Ventrals	Sub-caldals	Anal Plate	Temporals	PrO	PsO	SL	IL	SVL (mm)	TL (mm)	Locality (city/state)
[1]IB 10062(Holotype)	M	?-19-?	?	244	113	Entire	2+3	1	3	8	?	885	222	Rio Amanã-AM
[2]MZUFV1692	M	19-19-15	2	234	110	Entire	2+3	1	3	8	9	382	120	Aripuanã-MT
[2]MZUFV1734	F	19-19-15	2	229	109	Entire	2+3	1	3	8	9	226	67	Aripuanã-MT
[3]CBF 2460	M	?-19-?	2	227	114	Entire	2+3	1	3	7/8	?	590	360	Nacebe-Bolivia
[3]NMP6V 73610	M	?-19-?	2	227	113	Entire	2+3	1	3	8	?	515	185	Federico Román-Bolivia
[4]IB 53604	M	19-19-15	No	232	107	Entire	2+3	1	3	8	9	518	105	UHE Samuel-RO
MZUSP11345	F	19-19-15	2	226	108	Entire	2+3 (2+4)	1	3	8	9	497	176	São José do Rio Claro-MT
MZUSP11323	M	19-19-15	2	230	115	Entire	2+4	1	3	8	9	223	104	Juruena-MT
MZUSP11251	M	19-19-15	2	236	114	Entire	2+3	1	3	8	9	690	239	Cláudia-MT
MZUSP19797	M	19-19-15	2	231	110	Entire	2+3	1	3	8	9/8	506	171	Porto Velho-RO
MZUSP19289	F	19-19-15	2	238	Broken Tail	Entire	2+3	1	3	8	9	643	?	Babaçulândia-TO
MZUSP19290	M	19-19-15	2	242	103	Entire	2+3	1/2	3	8	9	630	188	Babaçulândia-TO
MZUSP19751	M	19-19-15	2	232	112	Entire	2+3	1	3	8	9	487	161	Porto Velho-RO
MZUSP20467	M	19-19-15	2	231	107	Entire	2+3	1	3	8	9	511	172	Porto Velho-RO
MZUSP19464	M	19-19-15	2	225	102	Entire	2+3	1	3	8	9	432	132	Porto Velho-RO
MZUSP20782	F	19-19-15	2	226	101	Entire	2+3	1	3	8	9	651	192	Porto Velho-RO
MZUSP20781	M	19-19-15	2	231	113	Entire	2+3	1	3	8	9	401	118	Porto Velho-RO

allowing its identification. The other two specimens were found on the left bank of Madeira River. MZUSP 19751 (Figure 3B) was found on 8 July 2011, on the ground at noon, near the district of Abunã (09°38′02.82″ S, 065°26′23.72″ W, 114 m a.s.l.) and MZUSP 20467 on 5 February 2012, on the ground at night (around 21:00) near the Caiçara waterfall (in the vicinity of the district of Nova Mutum Paraná) (09°26′56.3″ S, 064°50′00.8″ W, 115 m a.s.l.). The previously closest records from all these five specimens were: Samuel Power Plant, Rondônia, Brazil (Silva-Jr. 1993), *ca.* 200 km eastward, and Palmira, Pando, Bolivia (Moravec *et al.* 2009), *ca.* 150 km southwestern (Figure 1).

The color pattern is similar in all examined specimens and to those referred in the literature. They have a black head and a red-orange nuchal collar not completed ventrally; the dorsum and belly are black, with lateral cream-white blotches throughout the body and vertebral and paravertebral red-orange spots (not evident in MZUSP19290 due to faded coloration). Prado (1940) described the color pattern of the holotype based on an individual conserved in ethanol sampled three years before, which was similar to those described here. However the black surface of the head, dorsum and belly he described as green-bronzed could be an artifact of fixation.

We found little variation in pholidosis among the analyzed individuals and those from the literature including the holotype (Table 1). Prado (1940) describe that just the fourth and fifth supralabials contact the eye in the holotype; in our specimens and those referred by Costa *et al.* (2010) and by Silva-Jr. (1993), it is the third supralabial that contact the eye. Also, two individuals show a distinct number of temporals (2+4) from the holotype (2+3). We believe this variation is due to intraspecific variation. Scale counts and measurements of specimens are detailed in Table 1.

Considering that all ten previous records of *Siphlophis worontzowi* were restricted to the right bank of Amazon and Madeira Rivers and they represent important barriers to dispersion in several groups (Ayres and Cluttonbrock 1992; Haffer 1992, 2008; Ribas *et al.* 2012; Teixeira Jr *et al.* 2013), the record at the left bank of Madeira River was surprising (Costa *et al.* 2010). Thus, its presence on the left bank could be the result of recent dispersal through rafts of vegetation, frequently observed flowing downstream especially at the beginning of the rainy season, or efflux of humans crossing the river carrying large containers from one bank to another. Or even a relictual population isolated by the running of Madeira River toward Solimões river when the changes of the Amazon hydrography during the late Miocene (Horn *et al.* 2010), together an incipient sampling effort in the area are also possible explanations for the previously unknown presence of *S. worontzowi* in both banks of the river. Thus, we provide the first record of *Siphlophis worontzowi* to left bank of Madeira River in addition to the first record and extension distribution to Tocantins and Mato Grosso states and ecological data to this poorly known species.

ACKNOWLEDGMENTS

We are grateful to H. Zaher and C. Castro-Mello for allow access to specimens at MZUSP. We also wish to thank all people involved in the field work, Luís Storti and Marco Aurélio de Senna for ecological information about the specimens collected and Renato Gaiga for the photo. We would like to thank Energia Sustentável do Brasil (ESBR) and Arcadis Logos S.A. for support during field work. IBAMA for the authorization to work in the region (permit CGFAP 260/2010) and Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP) and Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) for financial support.

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Authors' contribution statement: FDV and AMN collected the data. FDV wrote the text with subsequent verification of MTJ, AMN and MTR.

Received: October 2014
Accepted: December 2014
Editorial responsibility: Pedro Nunes